

(iii) Co-locate control devices and instrumentation to allow visual assessment of system response to control input.

(2) Visual alarms and instruments on the navigating bridge must not interfere with the crew's vision. Dimmers must not eliminate visual indications.

(3) Alarms and instrumentation at the main navigating bridge control location must be limited to those that require the attention or action of the officer on watch, are required by this chapter, or that would result in increased safety.

§ 62.25-25 Programable systems and devices.

(a) Programable control or alarm system logic must not be altered after Design Verification testing without the approval of the cognizant Officer in Charge, Marine Inspection (OCMI). (See subpart 61.40 of this subchapter, Design Verification Tests). Safety control or automatic alarm systems must be provided with means, acceptable to the cognizant OCMI, to make sure set-points remain within the safe operating range of the equipment.

(b) Operating programs for microprocessor-based or computer-based vital control, alarm, and monitoring systems must be stored in non-volatile memory and automatically operate on supply power resumption.

(c) If a microprocessor-based or computer-based system serves both vital and non-vital systems, hardware and software priorities must favor the vital systems.

(d) At least one copy of all required manuals, records, and instructions for automatic or remote control or monitoring systems required to be aboard the vessel must not be stored in electronic or magnetic memory.

[CGD 81-030, 53 FR 17838, May 18, 1988; 53 FR 19090, May 26, 1988]

§ 62.25-30 Environmental design standards.

(a) All automation must be suitable for the marine environment and must be designed and constructed to operate indefinitely under the following conditions:

(1) Ship motion and vibration described in Table 9 of section 4-9-7 of the

ABS Steel Vessel Rules (incorporated by reference; see 46 CFR 62.05-1); note that inclination requirements for fire and flooding safety systems are described in 46 CFR 112.05-5(c).

(2) Ambient air temperatures described in Table 9 of part 4-9-7 of the ABS Steel Vessel Rules.

(3) Electrical voltage and frequency tolerances described in Table 9 of part 4-9-7 of the ABS Steel Vessel Rules.

(4) Relative humidity of 0 to 95% at 45 °C.

(5) Hydraulic and pneumatic pressure variations described in Table 9 of part 4-9-7 of the ABS Steel Vessel Rules.

NOTE: Considerations should include normal dynamic conditions that might exceed these values, such as switching, valve closure, power supply transfer, starting, and shutdown.

(b) Low voltage electronics must be designed with due consideration for static discharge, electromagnetic interference, voltage transients, fungal growth, and contact corrosion.

[CGD 81-030, 53 FR 17838, May 18, 1988, as amended by USCG-2003-16630, 73 FR 65189, Oct. 31, 2008]

Subpart 62.30—Reliability and Safety Criteria, All Automated Vital Systems

§ 62.30-1 Failsafe.

(a) The failsafe state must be evaluated for each subsystem, system, or vessel to determine the least critical consequence.

(b) All automatic control, remote control, safety control, and alarm systems must be failsafe.

§ 62.30-5 Independence.

(a) Single non-concurrent failures in control, alarm, or instrumentation systems, and their logical consequences, must not prevent sustained or restored operation of any vital system or systems.

(b)(1) Except as provided in paragraphs (b)(2) and (b)(3) of this section, primary control, alternate control, safety control, and alarm and instrumentation systems for any vital system must be independent of each other.

(2) Independent sensors are not required except that sensors for primary

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speed, pitch, or direction of rotation control in closed loop propulsion control systems must be independent and physically separate from required safety control, alarm, or instrumentation sensors.

(3) The safety trip control of § 62.35-5(b)(2) must be independent and physically separate from all other systems.

(c) Two independent sources of power must be provided for all primary control, safety control, instrumentation and alarm systems. Failure of the normal source of power must actuate an alarm in the machinery spaces. One source must be from the emergency power source (see part 112 of this chapter, Emergency Lighting and Power Systems) unless one of the sources is—

(1) Derived from the power supply of the system being controlled or monitored;

(2) A power take-off of that system; of

(3) An independent power source equivalent to the emergency power source.

§ 62.30-10 Testing.

(a) Automated vital systems must be tested in accordance with subpart 61.40 of this chapter.

(b) On-line built-in test equipment must not lock out or override safety trip control systems. This equipment must indicate when it is active.

Subpart 62.35—Requirements for Specific Types of Automated Vital Systems

§ 62.35-1 General.

(a) Minimum instrumentation, alarms, and safety controls required for specific types of automated vital systems are listed in Table 62.35-50.

(b) Automatic propulsion systems, automated electric power management systems, and all associated subsystems and equipment must be capable of meeting load demands from standby to full system rated load, under steady state and maneuvering conditions, without need for manual adjustment or manipulation.

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§ 62.35-5 Remote propulsion-control systems.

(a) *Manual propulsion control.* All vessels having remote propulsion control from the navigating bridge, an ECC or maneuvering platform, or elsewhere must have a manual alternate propulsion control located at the equipment.

NOTE: Separate local control locations may be provided for each independent propeller.

(b) *Centralized propulsion control equipment.* Navigating bridge, ECC, maneuvering platform, and manual alternate control locations must include—

(1) Control of the speed and direction of thrust for each independent propeller controlled;

(2) A guarded manually actuated safety trip control (which stops the propelling machinery) for each independent propeller controlled;

(3) Shaft speed and thrust direction indicators for each independent propeller controlled;

(4) The means to pass propulsion orders required by § 113.30-5 and § 113.35-3 of this chapter; and

(5) The means required by paragraph (d) of this section to achieve control location transfer and independence.

(c) *Main navigating bridge propulsion control.* (1) Navigating bridge remote propulsion control must be performed by a single control device for each independent propeller. Control must include automatic performance of all associated services, and must not permit rate of movement of the control device to overload the propulsion machinery.

(2) On vessels propelled by steam turbines, the navigation bridge primary control system must include safety limit controls for high and low boiler water levels and low steam pressure. Actuation of these limits must be alarmed on the navigating bridge and at the maneuvering platform or ECC.

(3) On vessels propelled by internal combustion engines, an alarm must announce on the navigating bridge and at the maneuvering platform or ECC, if provided, to indicate starting capability less than 50% of that required by § 62.35-35. If the primary remote control system provides automatic starting, the number of automatic consecutive attempts that fail to produce a start